

Development of logistics infrastructure in Yenisey Siberia

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Regional logistics system and its infrastructure acts as a factor of increasing the competitiveness of the region. The purpose of the "Yenisei Siberia" regional logistics infrastructure development is to promote the harmonious structuring of commodity and related flows of the three regions – Krasnoyarsk territory, the republics of Khakassia and Tuva. A prerequisite for the creation of an effective logistics infrastructure is a realistic scenario for the development of the economy for a long period or a system of scenario conditions that allow modeling its most likely trajectory. This is due to the fact that infrastructure projects have a long investment cycle. The article analyzes the level of development of the logistics infrastructure of small cities in the Krasnoyarsk Territory, the Republic of Khakassia and the Republic of Tyva. The relevance of infrastructure development as an integrated factor in socio-economic development is explained.

Introduction. Among the strategic objectives of regional development in the field of agriculture (agro-industrial complex), it is currently possible to highlight the development of interregional and regional infrastructure logistics systems (including: transport, communications and informatics) that provide and stimulate regional structural changes and the effectiveness of the regional economy.

Contrary to experts' opinion, the main obstacle hindering the modern development of regional logistics markets is the lack of high-level logistics infrastructure in the regions (with rare exceptions), which allows to provide comprehensive transport and distribution services to client companies, including customs clearance, cargo transshipment using various types of transport, warehousing and distribution. This increases the imbalance of cargo traffic, which affects the cost of logistics services.

Main text. The structure of the regional distribution network has a complex character and includes the basic functional links of the supply chains: suppliers - commodity producers, supply, production, sales, service and consumers.

The prerequisites for the formation of the logistics network of the agro-industrial complex of Yenisei Siberia were the following trends in the food market:

- high level of food imports;
- high level of losses of primary agricultural products;
- the existing commodity distribution infrastructure to a greater extent does not correspond to the tasks of agricultural development in the regions;
- the imbalance between the possibilities of agricultural producers and the existing demand for their products in the regional market that does not reflect the real potential of the agro-industrial complex of the regions.

The most important problems of the existing inter-regional logistics system in the food market should also be highlighted in this article:

- insufficient development of integrative relations in the field of agriculture to ensure the harvesting, processing of agricultural products and its distribution to the final consumer;

- insufficiently developed and practically tested set of issues covering the regulation of the agro-industrial sector, including the relationship of the state with subjects of the agrarian market, measures of price, tax and financial regulation of agro-industrial production, the optimal ratio of state and non-state regulation of agricultural markets, infrastructure and information in the AIC.
- The objectives of the project of development of the logistics system of the agro-industrial complex of Yenisei Siberia include:
 - improving the efficiency of the agro-industrial complex, ensuring supplies of high-quality competitive food to the market based on the coordination of the activities of the subjects of the agro-industrial complex and trade organizations,
 - improving the mechanism for the procurement of agricultural products, raw materials and food for state and municipal needs, including for the provision of domestic food supplement to the population,
 - reconstruction, modernization and structuring of infrastructure facilities, including logistics distribution and production centers for the sale of agricultural products;
 - development of exchange and electronic trade in agricultural products, raw materials and foodstuffs.
- The important principles of the organization of the logistics system of the agricultural sector should be taken into account:
 - an integrated approach (synchronized with regional development strategies, determining the depth of processing of agricultural raw materials, a reference point for the main market trends);
 - consideration of local specifics (volumes and rhythmicity of commodity flows between the regions - Krasnoyarsk Territory, the republics of Khakassia and Tyva, economically justified transport leverage competition with federal retail chains);
 - public private partnership;
 - increasing food security and increasing the market share of local agricultural producers.

The creation of the logistics system should help agricultural producers of the regions to simplify access to the consumer market in and outside the macro-region and, as a result, to expand their production and enter the foreign markets in Europe and Asia.

Cooperation of local agricultural producers will help to establish effective cooperation with small farms, to carry out purchases of agricultural products for sale and storage with certain characteristics of goods at a predetermined price and in a predetermined amount. The effect of cost reduction due to the increase in scale, year-round stable deliveries to distribution networks (including foreign ones) will cover all the participants in the supply chains planned for the creation in the distribution network [1,2].

The guiding idea of the proposed project is the development of the process of integrating agricultural enterprises of the regions into the logistics supply chains, which involves organizing relationships between participants in agricultural production based on the use of complementary factors of their activities and may provide an opportunity to obtain a positive synergistic effect based on the coordinated activities of participants in cooperative groups.

We will have to resolve issues arising from the features of the infrastructure elements of the agro-industrial complex of the regions, of which the logistics system will consist, such as:

- various forms of ownership and legal forms;
- different power, concentration, process equipment used, resources consumed;
- dispersed technical means and labor resources in a large area.

When applying the logistics approach to the integration of agricultural enterprises, it is necessary to take into account the possible forms of economic integration of agricultural enterprises: on a contractual basis, without combining financial, material and other resources; integration of a part of financial, material, and sometimes labor resources of the organizations participating in integration to create cooperative enterprises, while the relations are carried out on a long-term contract basis; coordination of labor, material and financial resources of households - participants of integration in common supply chains. In a market economy, contractual relations should be further strengthened on the basis of creating a stable contractual framework based on the mutual interest of the participants in the logistics system.

Expected results. According to foreign and Russian data, the use of scientifically based logistics methods can reduce the level of costs by 20%, inventories by 30-70%, reduce the circulation time of goods by 20-50%, which will lead, in general, to an increase in budget revenues of the regions (figure 1).

No	Indicator	The change in the Krasnoyarsk territory, republics Khakassia and Tuva	including in the republic of Khakassia
1	Revenue of agro-industrial enterprises	120615,00 million of rubles	16051,00 million of rubles
2	Growth of profits of agro-industrial enterprises	↑3666,85 million of rubles.	↑487,97 million of rubles
3	Increase in tax charges to the Federal Budget (3%)	↑110,01 million of rubles per year	↑14,64 million of rubles per year
4	Increase in tax charges to the Regional budget (17%)	↑623,36 million of rubles per year	↑82,96 million of rubles per year (10,01% of tax on profits of agro-industrial enterprises)

Figure 1 - General socio-economic results of the implementation of the program for creating a logistics network of wholesale distribution centers

Road map of the project. All the tasks of the project of the logistics system of the agro-industrial complex of the regions are divided into four evolutionary steps. At the same time, problem solving processes are systematically “sewn” into each other (figure 2).

Stage 1 – logistics within the farms, enterprises and organizations of the agro-industrial complex.

Stage 2 – the formation of supply chains between the participants of the agro-industrial complex in the regions.

Stage 3 – the logistics infrastructure of the agro-industrial complex in the regions.

Stage 4 – management of the logistics system of the agro-industrial complex in the regions

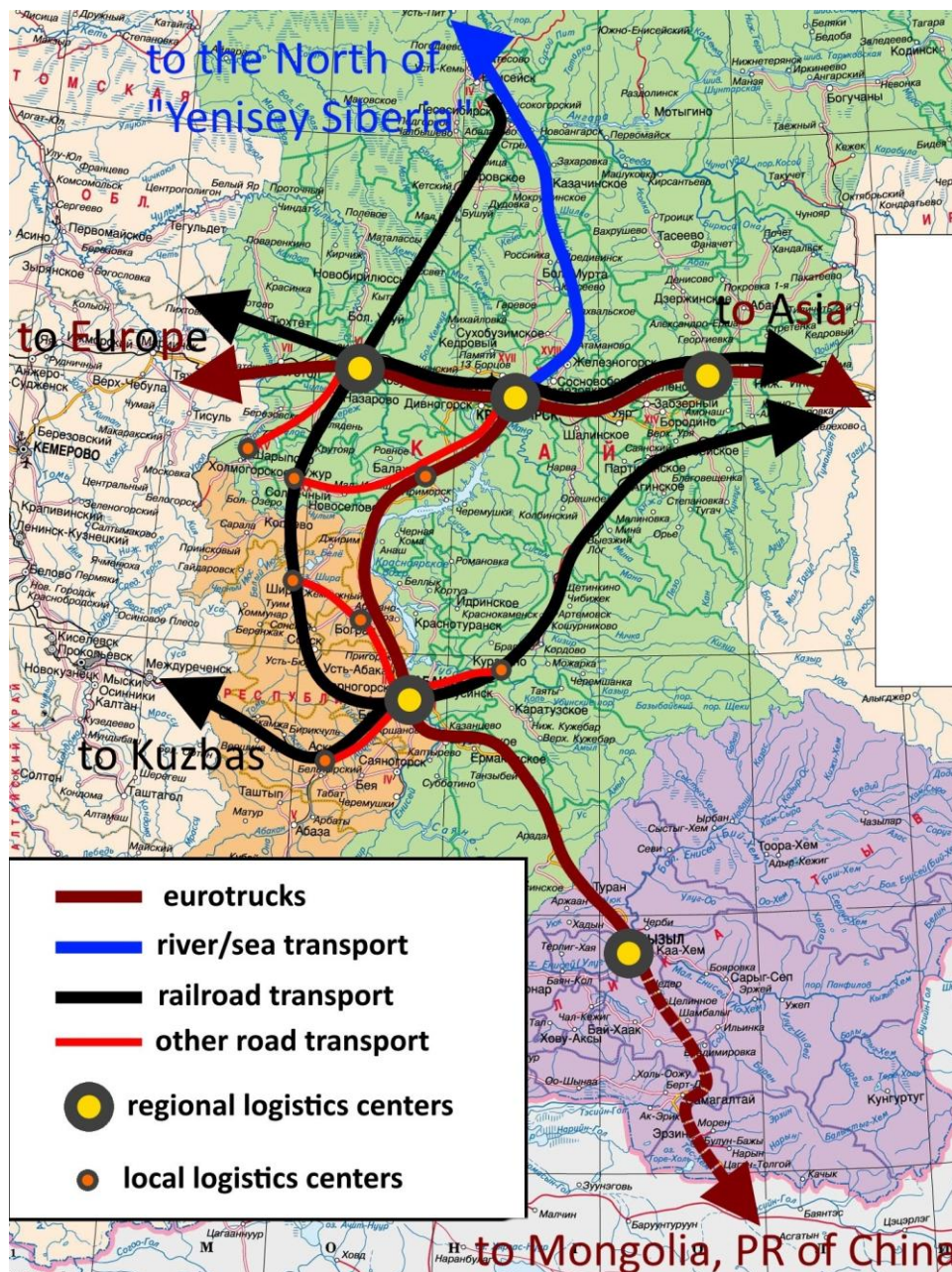


Figure 2 - Scheme of the functioning of freight forwarding enterprises in a logistics network of wholesale distribution centers in “Yenisey Siberia” macro-region

The multi-level system of logistics centers in the Krasnoyarsk Territory, the republics of Khakassia and Tyva is organized on the basis of the organizational and functional structure. The concept of a three-tier system of logistics centers for the collection, processing and marketing of food products in the regions has the following structure:

1. The first level of the system – the level of farms – the districts level.
2. The second level of the system - the level of supply chains – the inter-districts level.
3. The third level of the system is the interregional level.

The sequence of creation of the logistics system of the agro-industrial complex (LSAIC) can be represented as follows:

1. Setting logistic tasks for the development of the market for agricultural products.
2. Assessment of opportunities for cooperation with all participants of the agro-industrial complex.
3. Assessment of the influence of infrastructure factors on the efficiency of agricultural production.
4. Synthesis of organizational structure.
5. Synthesis of algorithms for optimal management of economic flows.
6. Optimization of logistic costs.
7. Development of a regulatory framework for state regulation of the agricultural products market.

As you know, logistics services are divided into transport (air, road, intermodal transport), storage (storage, packaging, sorting of goods) and related services (supplement management, transshipment, customs services, insurance). Among these, the transport services sector in Russia is the most developed, warehousing services are underdeveloped and are currently under development, and related services such as logistics consulting are in the process of becoming widespread in the country. It should be emphasized that today's problems in the Russian market of transport and logistics services are caused not only by the upcoming economical crisis, which only exacerbates the systemic deficiencies. Now in Russia the level of transport and logistics costs for subjects of any economic activity, especially in production sector, is one of the highest in the world. According to various calculations, these costs reach up to 20% of GDP. This is about a quarter more than in PR of China, and almost three times more than in the countries of European Union.

According to some data, Russian companies only spend three times more on transport than their European counterparts, but the cargo travels the same distance several times longer. An analysis of the state of the logistics industry in our country indicates that there are significant problems and barriers. The most important of them are, in particular:

- the territory of Russia, the largest in the world and the range of delivery of certain goods is estimated up to thousands of kilometers even inside the country;
- lack of investment (including foreign) in the logistics infrastructure;
- underdeveloped market of 3PL providers in most of the regions;
- lack of qualification of personnel of companies in the field of logistics and supply chain management;
- imperfection of the legislative and regulatory framework in the field of logistics;
- absence of reliable and unified statistical data on logistics;
- irrational development of distribution systems for goods and services (lack of a complex multi-level strategy for the development of distribution systems in industry and commerce, lack of organized commodity markets at the level of large and medium wholesale);
- the insufficient level of development of modern electronic communication systems, electronic networks, communication systems and telecommunications;
- the absence of almost all types of transport of modern vehicles that follow international standards of safety and efficiency;
- a high degree of physical and moral depreciation of the rolling stock of transport;
- the low level of development of production and technical base of warehousing;
- lack of modern technological equipment for processing products;
- insufficient level of mechanization and automation of warehouse operations;
- insufficient development of the industry for the production of modern packaging and packaging, etc.

Simple logistic operations are developing most dynamically in Russia: transportation and freight forwarding by all modes of transport. Our providers pay much less attention to complex logistics services, for example, integration and supply chain management from producer to final consumer. But the tendency to increase to provide more complex services is still observed.

The authors believe that the inefficiency of transport and logistics systems is one of the main factors hindering the economic growth of Siberian regions and Russia, as a whole.

The role of transport and logistics systems is to ensure the functioning of multi-level logistics facilities through the coordination and integration of flow processes in order to achieve the objectives of socio-economic development by improving the management of material and related flows [3]. The problem of insufficient development of logistics infrastructure remains one of the most relevant for the regions of the Yenisei Siberia. This problem is particularly acute outside the regional centers, including in small towns. Towns with a population of less than 50,000 inhabitants are traditionally classified as small cities. In addition to cities, the “small” category (according to the code of rules SP 42.13330.2011 from the Ministry of Regional Development of the Russian Federation) also includes all urban-type settlements.

Established mainly for the purpose of solving the problem of promoting the industrial development, so as to provide large industrial facilities, they are faced with the task of diversifying the economics. An obstacle to this is the high proportion of logistics costs caused by the insufficiency and uneven development of logistics infrastructure facilities.

As of May 2019, the territory of the macro-region “Yenisei Siberia” (including the Krasnoyarsk Territory, the Republics of Khakassia and Tyva) includes 48 out of 61 administrative-territorial districts with city status

of small towns. The total population of small towns is 530.7 thousand inhabitants (14.2% of the total population of the macro-region).

Considering the accessibility of transport and logistics infrastructure in the territory of municipalities belonging to small cities, we should mention that road transport in macro-region dominates, covering 93.75% of small cities in the Yenisei macro region (figure 3). In 6 out of 48 municipalities, this type of transport is uncontested. Railroads cover 27 of 48 small towns (56.25%), including 22 covered by public railways. At the same time, only 37.50% of small cities in the Yenisei macro-region carry passenger rail services. Only 27.08% of small towns have direct passenger connections to the center of the “Yenisei Siberia” macro-region. In the absence of an alternative in the form of air transport, the load on the road network of the macro-region increases, which increases the accident rate and increases the cost of transporting goods and passengers.

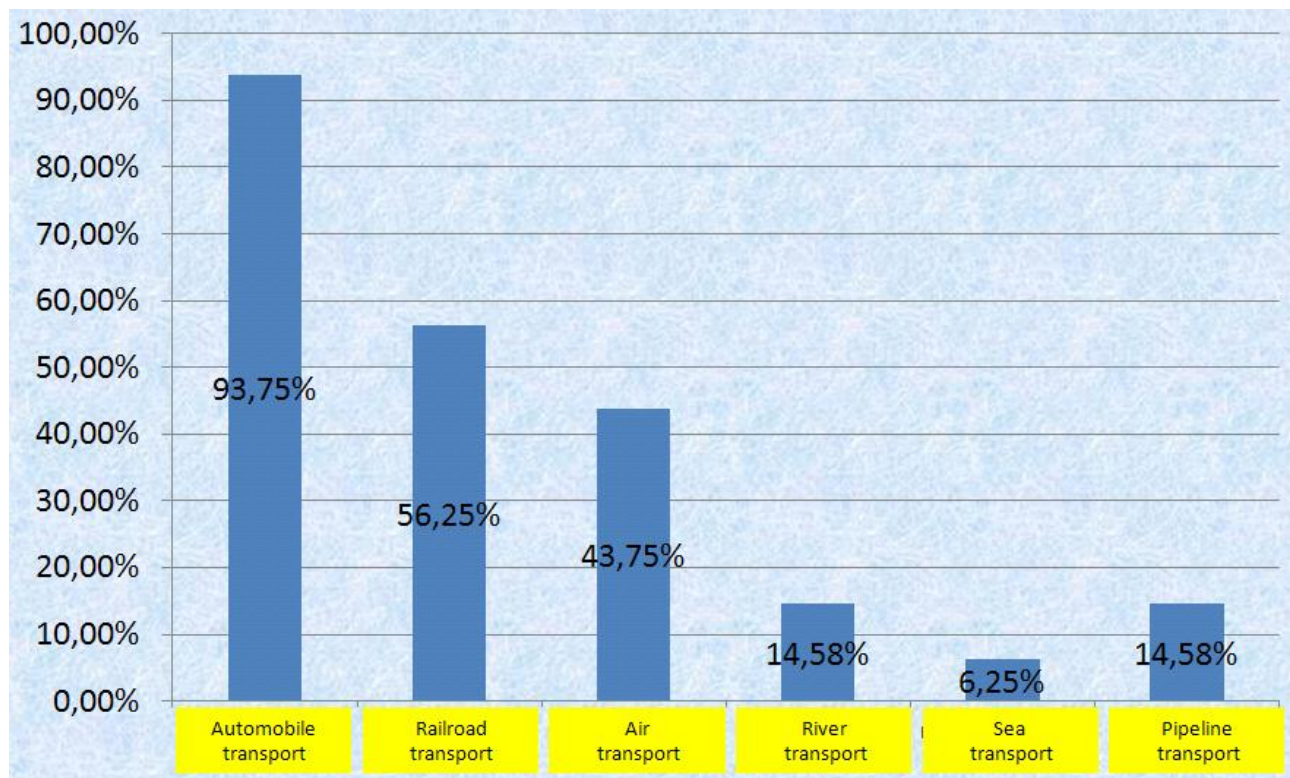


Figure 3 - Accessibility of transport and logistics infrastructure in small towns of the macro-region “Yenisei Siberia”

43.75% of cities of the Yenisei macro-region are located within 80 km. from public airports, of which regular passenger service is provided in 35.42% of small cities. Despite the wealth of the macro-region with water resources, regular shipments by water transport are carried out only from 7 small towns of the macroregion (14.58%), 3 of which also have the opportunity to receive sea ships with a higher ice class (Arc 7). Considering the security of the Yenisei macro-region with pipeline transport, it should be noted that there are no gas pipelines in the macro-region, which influences negatively towards the competitiveness of regional enterprises and forces to use low-quality lignite of Kansk and Achninsk Fuel and Energy Complex for head and electricity generation. The existing oil pipelines (Kuyumba-Taishet, Omsk-Krasnoyarsk-Angarsk) seize only 7 small towns in the macro-region.

The vast majority of the logistics service facilities in the macro-region are located in its central part, covering small towns of Krasnoyarsk urban agglomeration. According to data from open sources, the existing logistics centers providing 3PL and 4PL services are also located in Bogotol, closed administrative and territorial entity Zelenogorsk, Zaozerny, Uyar, Yeniseisk, urban-type settlement Ust-Abakan, Ak-Dovurak, urban-type settlement Kaa-Khem, thus covering only 27.08% of the small cities of the macro-region. In our opinion, this is one of the key shortcomings of regional development, limiting the access of products manufactured in small towns and districts to regional and federal sales markets.

We are to conclude that one of the key tasks facing the Krasnoyarsk Territory, the republic of Khakassia and Tuva are the expansion and diversification of the transport and logistics infrastructure, as well as supporting the development of logistics centers providing individual services to the level of individual

municipalities, including consolidation of shipments made in these areas of products. Considering that the carriers of the functions of logistics infrastructures are not only infrastructure facilities of a large urban economy, but also state and municipal authorities, public organizations, and local communities, we can speak of a logistics infrastructure as a factor of integration that provides socio-economic development at the regional level.

Conclusion. The influence of the subsystem of the logistics infrastructure of the regions of the Yenisei Siberia on the economic situation of the regions is multidimensional: it affects the production, supply and marketing activities, the conditions of personal life of citizens. The problems that exist during the movement of material, financial, information flows and people are signs of a lack of effective functioning of the existing inter-regional logistics system.

The proposed formulation of the problem solving reveals the presence of the dual contribution of the regional logistics infrastructure to the gross regional product: firstly, the direct contribution of the service component to the gross regional product and, secondly, the indirect (pushing) contribution to the development of its production component warehousing services in the distribution network, which also allows to determine the status of the regional logistics infrastructure as growth poles in the regional economy on.

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